

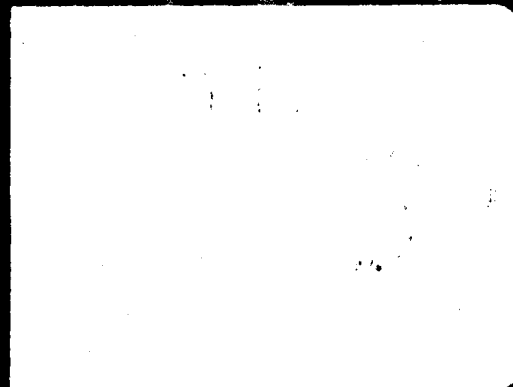
Report to the Co-Chair, Congressional
Military Reform Caucus,
House of Representatives

GAO
AD-A239 776



GOVERNMENT CONTRACTING

Using Cost of Capital to Assess Profitability



91-09024





United States
General Accounting Office
Washington, D.C. 20548

National Security and
International Affairs Division

B-236689

August 16, 1991

The Honorable Barbara Boxer
Co-Chair, Congressional Military Reform Caucus
House of Representatives

Dear Madam Co-Chair:

This report responds to your request that we evaluate the effectiveness of the government's current method of assessing contractors' profitability levels, and identify other methods that might better establish appropriate levels.

The National Defense Authorization Act for Fiscal Year 1989 requires the Department of Defense (DOD) to report annually to the Congress on the financial health of the defense industrial base. DOD must develop and maintain a plan to ensure that its policies meet the long-term needs of DOD for industrial resources and technology innovation. The 1989 act also requires DOD to establish a Financial Analysis Methodology Committee to recommend methods for measuring contractors' profitability. The recommendations in this report are intended to provide the basis for the development of such a method.

We plan to distribute this report to the Secretary of Defense and other interested parties. We will also make copies available to others upon request.

This report was prepared under the direction of Paul F. Math, Director of Research, Development, Acquisition, and Procurement Issues. He may be reached at (202) 275-8400 if you or your staff have any questions. Other major contributors are listed in appendix II.

Sincerely yours,

Frank C. Conahan

Frank C. Conahan
Assistant Comptroller General



Accession Ver	
NTIS GRA&I	<input checked="checked" type="checkbox"/>
DTIC TAB	<input type="checkbox"/>
Unannounced	<input type="checkbox"/>
Justification	
By _____	
Distribution/	
Availability Codes	
Dist	Avail and/or Special
A-1	

Executive Summary

Purpose

The Department of Defense's (DOD) policies must provide adequate support for the long-term needs of the defense industrial base. Traditionally, the financial impact of U.S. government policies on defense contractor profitability has been measured by comparing defense contractors' profitability with that of various groupings of non-defense durable goods manufacturers. Defense contractors have objected to this comparison, arguing that it does not accurately accommodate the differing levels of risk. The Co-Chair of the Congressional Military Reform Caucus asked GAO to (1) evaluate the effectiveness of the government's current method of assessing contractors' profitability levels and (2) identify other methods that might better identify appropriate levels of defense contractors' profitability.

Background

The Congress has required DOD to report annually on the financial health of the defense industrial base.

Previous studies on the profitability of defense contractors have determined the appropriateness of profitability levels by comparing the return on assets (the ratio of income to assets) of non-defense firms with the return on assets of defense contractors. Defense contractors have objected to this comparison because risk was not properly considered. Financial theory relates profitability levels expected by investors to the perceived amounts of investment risk: the higher the perceived risk of an investment, the higher the expected profitability.

Defense contractors have stated that historically their stock price/earnings ratio has been below market averages. They claim that this increases their cost of capital, which contributes to an increased cost of doing business.

Results in Brief

Using the return on assets measure to assess the profitability of defense contractors is beneficial because it recognizes how government financing can affect contractors' levels of profitability. However, there are reasons to consider market-oriented financial measures for assessing the financial health of the defense industrial base. For example, calculating the cost of capital is a financial technique that reflects the risk expected by the capital markets.

The cost-of-capital concept, while widely employed in numerous industry settings, has not been used by DOD to assess whether defense

contractors' profitability on government contract work is at an appropriate level. Cost of capital, when compared with the return on that capital, could provide useful information on profitability levels over time. This measure, used along with other financial measures, would eliminate the requirement that defense contractors' profitability be compared solely with that of other companies, thereby reducing concerns about whether firms are comparable.

The cost of capital is not the only measure that should be used in evaluating the financial health of government contractors. GAO has previously reported on the financial measures that should be used to assess the effect that federal policies have on government contractors' profitability.¹ The cost-of-capital concept would be used in conjunction with other financial measures to assess the cumulative impact that government policies are having on contractors' financial health.

The cost of capital is typically estimated using data from the liability and equity sections of the balance sheet together with historical data on actual investment returns. The return on assets method uses data from the asset section of the balance sheet. Consideration of the two sides of the balance sheets would provide a more valid picture of a company's financial health; therefore, using both measures would ensure a more comprehensive analysis of contractors' profitability.

Financial data specific to the segments of a company that perform government work is generally not publicly available. Therefore, the framework of data for measuring the profitability and the cost of capital for the defense sector of a company is not in place; its implementation would depend on government policymakers' developing guidelines and procedures for calculating the segment-level cost of capital.

GAO's Analysis

Shortcomings of Current Methods of Assessing Profitability

GAO noted two shortcomings of the government's current method of assessing of defense contractors' profitability. The first of these shortcomings was the failure to distinguish between firm- and segment-level risk. For example, past ad hoc studies looked at profitability at the

¹Government Contracting: Financial Measures for Evaluating Contractor Profitability (GAO/NSIAD-90-200BR, Sept. 12, 1990).

segment level, but measured risk at the firm level. GAO's analysis indicated that individual segments of a firm not only could have different levels of profitability, but they could also have different levels of risk. In fact, GAO found that the risk associated with an individual segment of a firm could be significantly different from the risk associated with the firm as a whole. Second, past studies used data that was aggregated in a manner that could have skewed the results of the comparison. GAO's analysis showed that the average profitability level of the non-defense group may have been different, if the data had been more properly aggregated.

Relationship Between the Cost-of-Capital and Profitability Levels

The cost-of-capital concept has many business applications that could be adapted for use in assessing the appropriate level of defense contractors' profitability. GAO found that (1) companies used the cost of capital as a benchmark in choosing among alternative capital investment projects; (2) the utility industry used the cost of capital in their rate-setting process to establish an equitable rate of return for the company; and (3) Wall Street's financial firms used the cost of capital for, among other things, determining the value of a firm's segment that is being sold.

To suggest an application of the cost of capital concept to defense profitability analysis, GAO examined the relationship between the profitability levels and the cost of capital for companies in the Standard and Poors' Industrial Index over a 10-year period; specific data on companies' segments doing defense work was not available. Over the 10-year period that GAO analyzed, the Standard and Poors companies' average return on invested capital and their average cost of capital were the same. This indicates that the companies studied are generating sufficient earnings, in the long term, to equal their cost of capital. GAO believes that if segment-level financial data were available, this type of analysis could be applied specifically to defense contractors.

Lack of Financial Reporting of Segment-Level Data

GAO's research indicated that companies often distinguished between their firm-level cost of capital, segment-level cost of capital, and project-level cost of capital. To calculate segment-level cost of capital requires such things as an allocation of debt and equity. GAO recognizes that currently, there are no universally agreed-upon procedures to allocate company debt and equity to the segments. However, development of such procedures would enable calculations of the costs of capital for the segments of companies that do defense work.

Previous major studies needed and used segment-level data for assessing an industry's financial health. Providing meaningful financial assessments of the defense industry's financial health requires segment-level data, which is integral in calculating the cost of capital and properly determining the impact of government policies that affect defense contractors.

A financial reporting system that accurately measures defense contractors' profitability would require (1) the mandatory participation of defense contractors, (2) an annual collection of segment-level financial data, (3) analysis of data on an aggregated, rather than on a contract-by-contract or contractor-by-contractor, basis, and (4) the confidentiality of segment-level data (that is, an independent firm, similar to a public accounting firm, would collect segment-level data, which would be aggregated before it was made available to another source). The British system of monitoring the profitability of the government's contractors contains these four elements.

Recommendation to the Congress

GAO recommends that the Congress enact legislation to require the government's contractors to annually report segment-level financial data to enable policymakers to measure profitability and the cost of capital for assessing the financial health of the defense industry.

Recommendation to the Agency

GAO recommends that the Secretary of Defense develop procedures to add the cost-of-capital concept to DOD's analytical framework for assessing the profitability level of the defense industry over time. This would require that data, specific to the segment doing defense work in each company, be gathered on a recurring basis.

Agency Comments

As requested, GAO did not obtain official agency comments on this report. However, it discussed information obtained during the review with agency officials.

Contents

Executive Summary		2
Chapter 1		3
Introduction	Objectives, Scope, and Methodology	9
Chapter 2		11
Past Profitability Studies—	Importance of Calculating Risk in Assessing Profitability	11
Shortcomings in Measuring Risk	Framework for Measuring Risk Using the Current Method	11
	Conclusion	14
Chapter 3		15
Cost of Capital Useful in Assessing Appropriate Levels of Profitability for Defense Contractors	Cost of Capital Reflects Risk	15
	Current Applications of the Cost of Capital	15
	Using the Cost of Capital to Assess Contractors' Profitability	16
	Guidelines to Implement the Cost-of-Capital Method for Assessing Profitability Levels	18
	Conclusion	19
	Recommendation	19
Chapter 4		20
Lack of Segment-Level Data	Major Efforts to Gather Segment-Level Data	20
	Use of the Cost-of-Capital Concept Will Require Segment-Level Data and Allocation	21
	Conclusion	21
	Recommendation to the Congress	22
Appendixes		
	Appendix I: Methodology for Calculating the Cost of Capital	24
	Appendix II: Major Contributors to This Report	27

Table	Table 3.1: Cost of Capital and Profitability for the Standard and Poors' Industrial Index Averaged Over a 10-Year Period	17
	Table I.1: Weighted Average Cost of Capital Discounted Cash Flow Methodology	26

Figure	Figure 3.1: Average Cost of Capital Versus ROIC	18
--------	---	----

Abbreviations

DFAIR	Defense Financial and Investment Review
DOD	Department of Defense
GAO	General Accounting Office
ROA	Return on assets
ROIC	Return on invested capital

Introduction

Under the National Defense Authorization Act for 1989, DOD must develop and maintain a plan to ensure that its policies meet the long-term needs of DOD for industrial resources and technology innovation. The 1989 act also requires DOD to establish an Advisory Committee on Study Methodology to recommend methods for measuring contractor profitability.¹

Profit is a primary goal of business enterprise. Profit rewards and impels efficiency, innovation, and investment; it compensates firms for employing capital, assuming risk, and managing resources. With profits firms can pay dividends, service debt—in effect, attract and retain external financing—and invest in business enterprises. Suitable returns on owners' investment attract firms to and retain firms in an industry; alternatively, unsuitable returns on investment—if sustained—provide a strong motivation to invest in other endeavors.

For those products that the government buys from the competitive market, the price (including profit) is set by the market place. For products acquired at other-than-established market prices, the government sets policies and procedures that attempt to provide for a fair and reasonable return on work performed. An extensive regulatory framework has been necessary to establish a working relationship between the government and contractors who engage in furnishing it goods and services. To ensure that this regulatory framework is achieving the desired results, legislation was enacted that required DOD to develop and maintain a plan to ensure that its policies were structured to meet the long-term needs of DOD for industrial resources and technology innovation.

In past attempts to gauge the financial health of contractors involved in defense work, the government has sponsored ad hoc studies to evaluate contractors' profitability. The studies compared the profitability of government contractors with the profitability of commercial firms having a similar industrial classification (for example, manufacturers of durable goods). In some cases, defense contractors have objected to these comparisons, arguing that adjustments are necessary to accommodate differences in risk.

¹In this report, "profit" is defined as the return received on a business undertaking after all operating expenses have been met. "Profitability" is used to describe overall financial health.

The defense industry has stated that its businesses are different from the businesses of commercial durable goods manufacturers. They maintain that comparing the profitability of the two groups is not appropriate: the level of profitability expected by the capital markets for investments is different for each group because the groups do not have comparable risks. They stated that historically the defense contractors' price/earnings ratios have been below the market averages. They claim this increases their cost of capital, which contributes to an increased cost of doing business.

Objectives, Scope, and Methodology

The Co-Chair of the Congressional Military Reform Caucus asked GAO to (1) evaluate the effectiveness of the government's current method of assessing contractors' profitability levels and (2) identify other methods that might better identify appropriate levels of defense contractors' profitability. In addressing these objectives, we reviewed the following:

- criteria used by past studies to assess levels of profitability for government contractors;
- financial theory as it related to determining an appropriate level of profitability for companies, based on risk;
- policies, practices, and criteria selected foreign governments used to address the issue of contractor profitability; and
- practices companies used to measure and assess the financial performance of individual segments within their own companies.

We reviewed profit studies from 1967 to 1988, as well as regulations, dealing with contractor profitability. Our analysis of the profitability studies focused on the methodology used to determine whether profitability levels were appropriate and how these studies conformed to financial theory and practice.

We reviewed the financial literature to identify the financial methods used to determine whether levels of profitability were commensurate with the level of return expected by the capital market for investments of a given level of risk.

To determine how other governments established or compared the profitability of their contractors, we visited key officials in Great Britain, West Germany, and Canada. These officials included (1) the Ministry of Defense, the House of Commons Defense Committee, and the National

Audit Office in the United Kingdom; (2) Parliament's Defense Audit Subcommittee, the Ministry of Defense, and the Ministry of Finance in Germany; and (3) Supply and Services in Canada.

We interviewed officials at various multidivisional corporations to determine how they measured the financial performance of individual segments within a company. We interviewed several Wall Street financial experts to discuss the implications of relating the cost of capital with different measures of return and adjusting for risk.

We computed the cost of capital for the companies listed over a 10-year period (at the firm-level) in the Standard and Poors' Industrial Index. Our calculation used two methods — discounted cash flow and the capital asset pricing models — to calculate the cost-of-equity capital. Appendix I provides additional details on the data and analytical methods we used to estimate the cost of capital.

We performed our review from March 1990 to March 1991 in accordance with generally accepted government auditing standards.

Past Profitability Studies—Shortcomings in Measuring Risk

DOD's previous studies on the profitability of defense contractors (1) collected segment-level data and (2) recognized the effect of government-sponsored financing on defense contractors' profitability. However, past studies had their shortcomings. For example, the ad hoc studies looked at profitability at the segment level, but measured risk at the firm level in assessing appropriate profitability levels. In other words, previous profitability studies have not distinguished between firm- and segment-level risk. Second, past studies aggregated data in a manner that could have skewed results.

Importance of Calculating Risk in Assessing Profitability

Financial theory directly relates the level of profitability with the risk of the effort undertaken. Risk is defined as the dispersion of returns around expected (long-run averages) levels.

Applied to defense acquisition, this principle requires that defense policies provide a level of profitability commensurate with perceived risks. Access to financing is a necessary condition for contractors to function as efficient ongoing, viable, private concerns.

Framework for Measuring Risk Using the Current Method

Profitability studies of defense contractors have attempted to account for risk through a comparative analysis with non-defense durable goods manufacturers. Defense contractors have objected to this comparison—citing how their risk is different from non-defense durable goods manufacturers and therefore their profitability levels should not be compared, unless appropriate adjustments are made to accommodate differences in risk.

Past studies have evaluated the relationship between profitability and risk using the following steps:

- obtaining segment-level profitability data on an ad hoc basis from companies that performed defense work;
- measuring profitability levels using return on investment as the principal financial measure;
- selecting publicly reporting firms relatively free from price and profit controls that were judged to produce goods similar to those produced by defense companies; and
- evaluating risk by measuring the returns for both defense and non-defense firms over time.

Segment-Level Data Used to Measure Part of Company Performing Government Work

For ad hoc profitability studies, defense contractors have been requested to submit segment-level data to measure the parts of the company performing defense work. Not generally available in published financial reports, segment-level data was furnished voluntarily to study defense contractor profitability.

The last time DOD gathered segment-level financial data was for its latest profitability study, Defense Financial and Investment Review (DFAIR). DOD has not collected segment-level data for years after 1983. Nearly 10 years prior to 1983, segment-level data was collected for DOD's "Profit 76" study.

Financial data is generally not publicly available on a recurring basis for just those segments of a company that perform government work. Chapter 4 discusses the lack of segment level data and the rationale for collecting segment-level financial data on a recurring basis to evaluate the financial health of the defense industry and the need to revise DOD's policies.

Measuring Profitability Using the Return on Investment Method

DOD has used return on investment as the principal financial measure in assessing contractor profitability since 1976. To measure return on investment,¹ DOD calculates the return on assets (ROA), which is the ratio of operating income to assets. ROA is the desirable measure of profitability because it (1) provides a basis for measuring the cumulative impact of government policies, (2) can be computed at the segment level, (3) can be derived from historical financial data which can be audited, and (4) explicitly recognizes how government financing can affect contractors' profitability levels.

While not suitable as overall profitability measures, financial measures other than ROA can be used for examining the effect of various government policies on some aspect of firm performance or segment-level performance. For example, data to measure such things as research development ratios can show the degree to which government contractors are required to expend non-recoverable funds for research and development. In a previous report,² we discussed the various financial measures that would be useful in assessing the effect of various government policies in future studies of contractors' financial health.

¹Return on assets is one way to measure return on investment.

²Government Contracting: Financial Measures for Evaluating Contractor Profitability (GAO/NSIAD-90-200BIR, Sept. 12, 1990).

In addition, the defense industry has indicated that ROA does not fully reflect the financial markets' perception of risk. Defense contractors believe that other measures incorporating risk should be considered. Chapter 3 discusses the feasibility of calculating the return on capital in future studies of contractor profitability.

Constructing Groups for Comparison

Previous studies of profitability have compared the profitability of government contractors with that of commercial durable goods manufacturers. If properly constructed, comparable groups, can provide useful information on appropriate profitability levels. We found, however, that several profitability studies used inappropriate groupings that could have distorted the results of the conclusion drawn from such a comparison.

For example, DOD's DFAIR used selected non-defense firms that had been classified into several different product groups that it believed were comparable to defense companies. Our concerns with this methodology are that in its comparative analysis, the classification process included companies that have several product lines that were not comparable to defense work, yet the earnings were considered in the comparative analysis. DOD used the two-digit Standard Industrial Classifications. This classification enabled DOD to use the financial data contained in the Department of Commerce's Quarterly Financial Reports but this did not result in distinct product groups. Further, two groups affected the overall average profitability for the industry more so than the other groups.

Measuring Risk at Firm Level

DFAIR differed from DOD's earlier studies on profitability by explicitly measuring risk. However, because of the lack of available data, DOD had to measure risk at the firm level. It measured risk by comparing the variability of the firm-level profits of the defense firms with the variability of profit levels for non-defense firms over time.³ This technique suggests that if profit levels vary significantly over time, there is additional risk.

DFAIR collected segment-level data to measure profitability but used firm-level data to measure risk. Thus, it implied that firm- and segment-

³A sample of defense and commercial companies was compiled based on the Standard Industrial Classifications of those companies selected to participate in DFAIR.

level risks were the same and that, therefore, comparing levels of profitability was appropriate. In fact, the level of risk of a corporate segment may be significantly higher (or lower) than that of the corporation as a whole.

To explore the differences between firm-level and segment-level risk, we conducted risk analysis for a 6-year period using a similar methodology to that of DFAIR, including the use of many of the same companies. We analyzed risk and return for segments not only within companies but also by industry groups. The results indicated the following:

- The segment-level risk and return differed from those for the entire company. Indeed, the results indicated that on average the segments with the highest risk were more than three times as risky as the firms' level of risk.
- Segments that operate in different industries have different levels of profitability, as well as different levels of risk. Risk among segments in different industries was also as much as three times more than the average risk level for the companies in our sample.

Conclusion

Establishment of a system that would use the comparative analysis used in previous studies along with a segment-level risk analysis would provide valuable information on the financial condition of the defense industrial base. Comparative analysis using ROA is beneficial because it explicitly recognizes how government financing can affect contractors' profitability levels.

Cost of Capital Useful in Assessing Appropriate Levels of Profitability for Defense Contractors

While widely used by financial analysts, the cost-of-capital concept has not been used by DOD to assess whether contractors' profitability is at an appropriate level. The cost of capital concept does not require a comparison of the profitability of defense contractors with that of non-defense durable good manufacturers. The addition of this concept to DOD's analytical methodology for assessing profitability levels would be beneficial in making comparisons meaningful.

Cost of Capital Reflects Risk

Contractors look to the capital markets to obtain the capital required to purchase new plant and equipment and expand their operations. The cost of capital reflects the cost of funds used to acquire assets and operate a firm.

Choosing the source to finance an ongoing concern affects a firm's cost of capital. Debt and equity are the principal sources of funds. Each has a cost to a company (for example, interest on debt and dividends on stock). These costs largely depend on the risk that investors perceive of a company's security (for example, a stock or bond).

Current Applications of the Cost of Capital

The cost of capital has many business applications. Companies use the cost-of-capital concept to support capital budgeting decisions. Companies can sometimes evaluate the attractiveness of alternatives for prospective investments by calculating discounted net cash outflows over the life of the competing projects. The rate of returns are then compared against the cost of capital of that firm. Corporations generally invest in projects that meet or exceed the assigned cost of capital over the life of the project.

The cost of capital can be calculated for all firms that compete for funds in the capital market. Most of the firms we visited computed their own cost of capital at the firm level. The cost of capital is used as a general guideline for various investment decisions, for example, as a benchmark against which to measure the discounted returns from a potential acquisition. For investment analysis, some firms differentiate the cost of capital for individual programs on the basis of the risk associated with the cash flows for each program. Judgment is applied to adjust the corporate cost of capital to reflect the risk associated with a specific program or company segment.

Cost of capital is a principal determinant of the return allowed by regulators in the utilities industry. During the rate-setting process, the utilities generally calculate the cost of capital, in part, by applying it to the rate base (assets used for supplying the services). The cost of capital represents the earnings on invested capital needed to cover the return required by investors.

Some Wall Street's financial firms calculate the cost of capital to determine the value of a firm, as a basis for evaluating the attractiveness of a firm's earnings. These firms also use the cost of capital concept to determine whether the earning potential of a specific segment of a firm exceeds its selling price. They allocate debt and equity to the segment as part of this process.

Using the Cost of Capital to Assess Contractors' Profitability

On the basis of our analysis of the balance sheet and income statement's for companies in the Standard and Poors' Index, the cost of capital can be calculated for firms by using publicly available financial data. However, to conduct an accurate analysis of the profitability of companies' segments that perform defense work, government policymakers would have to develop guidelines and procedures to gather segment-level data and to calculate the segment-level cost of capital. Profitability could then be measured for homogenous groupings of companies' segments (airframe, electronics, and so forth) and measured against the cost of capital of these comparable groupings of companies.

Relationship of Cost of Capital and Profitability Levels

As stated previously, financial theory suggests that a firm's realized return on invested capital should, in the long term, approximate its cost of capital. To demonstrate the application of this financial theory, we examined the relationship between profitability levels and the cost of capital for the companies in the Standard and Poors' Industrial Index over a 10-year period, 1980 to 1989.

We found that over the 10-year period Standard and Poors' companies' average return on invested capital and their average cost of capital were essentially the same in the long term. This indicates that companies generated sufficient earnings to cover their cost of capital in the long term. If appropriate segment-level data were collected, the cost of capital could be computed for groups of defense industries (airframe, electronics, shipbuilders, and so forth) as a principal indicator of the return required by those groups over time. If cost of capital were used in conjunction with return on invested capital (ROIC), policymakers could

assess defense profitability trends and determine when changes to policies or other regulations were needed to ensure that individual industry groups had adequate profitability levels over time.

We calculated the cost of capital using two different models.¹ We compared cost of capital with profitability (ROIC).² Table 3.1 shows that the average cost of capital over the 10-year period was 13 percent, compared with a ROIC of 13 percent.

Table 3.1: Cost of Capital and Profitability for the Standard and Poors' Industrial Index Averaged Over a 10-Year Period

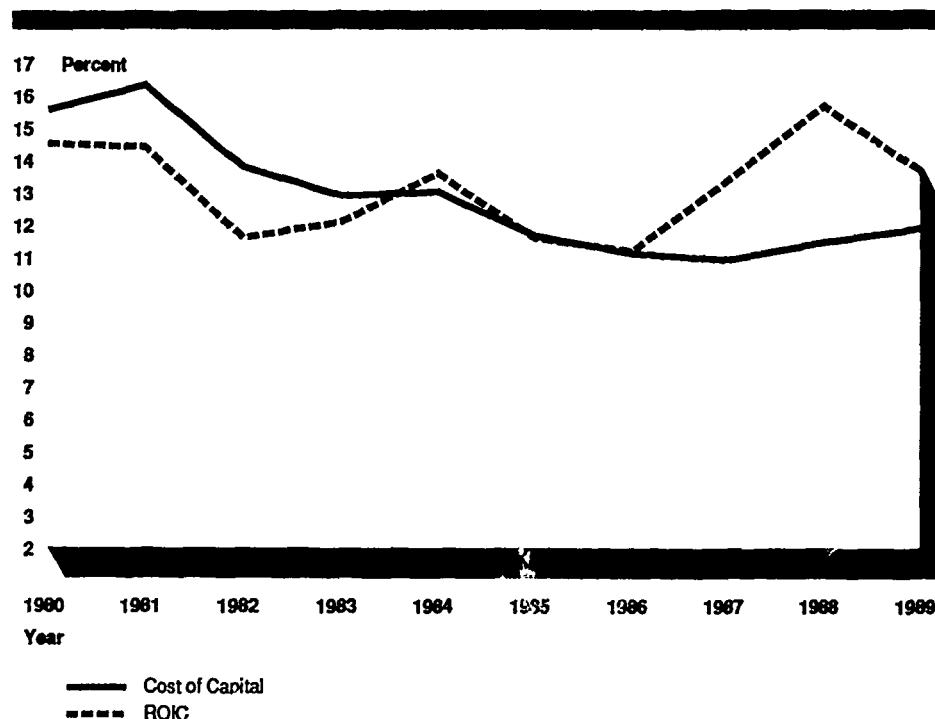
Cost of capital models	Cost of capital	Return on capital
Capital asset pricing	14	13
Discounted cash flow	12	13
Average	13	13

As applied to the defense industry, policymakers should establish appropriate long-term relationships between the cost of capital of specific industry groups and ROIC for each group. To hypothetically represent the defense industry, we used the Standard and Poors' Industrial Index because segment-level data was not available. Figure 3.1 shows ROIC exceeding the cost of capital from 1987 to 1989 for the Standard and Poors' Industrial Index. If ROIC were to continue to exceed the cost of capital in the long term, then government policymakers may have to consider changes that would reduce the ROIC. If, over time, the trend reversed, policymakers may have to consider changes that would increase ROIC.

¹As stated earlier, debt and equity are the principal sources of funds. Several methods exist for calculating the cost of equity. We used the Dividend Yield Plus Growth Discounted Cash Flow Model and the Capital Asset Pricing Model. The results will vary depending on the specific model and sources of data employed.

²ROIC is the ratio of after-tax earnings plus interest divided by short- and long-term debt and equity.

Figure 3.1: Average Cost of Capital
Versus ROIC



Guidelines to Implement the Cost-of- Capital Method for Assessing Profitability Levels

Limitations exist for using or comparing the segment-level cost of capital with segment-level profitability measures. The cost of capital is normally calculated at the firm level. However, companies may have several segments and projects. A project or a segment's risk may be different from the firm's risk. Currently, there are no universally accepted methods for calculating the segment-level cost of capital. For example, there are no universally accepted methods for allocating a company's debt and equity to individual segments. However, two of the companies included in our review allocated equity and debt to their segments for the purpose of constructing a segment-level cost of capital.

Development of generally accepted allocation methods needs to be established as a first step to making segment-level calculations of the cost of capital possible. For example, a large aerospace firm presented data to GAO showing how the cost of capital could be calculated at the segment level. It made allocations of debt and equity using commonly available bases. To conduct its analysis for segment-level data, an allocation of the company's debt and equity to the segments was made by (1) multiplying firm-level equity by the ratio of segment-level assets to firm-level

assets and (2) multiplying the total capital structure (that is, total debt and total equity) by the ratio of segment-level assets to firm-level assets. In addition, to make meaningful segment-level calculations of the cost of capital, it would be important to determine the cost of the debt and equity components adjusted for differences in risk between the segment-level and firm-level.

Conclusion

The cost-of-capital concept would facilitate a comparison of the profitability of defense contractors with that of non-defense durable good manufacturers. To obtain the benefits of the cost-of-capital methodology, procedures must be developed to compute the cost of capital at the segment level. Procedures to allocate debt and equity to segments within a company could be established and would facilitate the calculations of the cost of capital. In addition, to make meaningful segment-level calculations of the cost of capital, it would be important to determine the cost of the debt and equity components adjusted for differences in risk between the segment-level and firm-level.

The cost of capital is not the only measure that should be used in evaluating the financial health of government contractors. We have previously reported on the financial measures that should be used to assess the effect that federal policies have on government contractors' profitability.³ The cost-of-capital concept would be used in conjunction with other financial measures to assess the cumulative impact that government policies are having on contractors' financial health over time.

If the cost of capital were used in conjunction with ROIC, policymakers could assess trends in the defense industry's profitability and determine when changes to DOD policies or other regulations were needed.

Recommendation

We recommend that the Secretary of Defense develop procedures to add the cost-of-capital concept to its analytical framework for assessing the profitability levels of the defense industry over time. This implementation would require that data, specific to the segment doing defense work in each company, be gathered on a recurring basis.

³Government Contracting: Financial Measures for Evaluating Contractor Profitability (GAO/NSIAD-90-200BR) (Sept. 12, 1990).

Lack of Segment-Level Data

The government's current method of assessing contractors' levels of profitability used along with an assessment of contractors' segment-level cost of capital would ensure that DOD's policies provided adequate support for the long-term needs of the defense industrial base. The cost of capital is typically estimated using data from the liability and equity sections of the balance sheet together with historical data on investment returns. ROA uses data from the asset section of the balance sheet. Using both measures would provide a more comprehensive analysis of contractors' risk and profitability. However, financial data is generally not publicly available on a recurring basis for just those segments of a company that perform government work. Therefore, the framework of data for assessing the relationship between risk and profitability is not in place.

The National Defense Authorization Act for 1989 requires DOD to establish an Advisory Committee on Study Methodology to recommend methods for measuring profitability, thereby ensuring uniformity and consistency in the methods used to assess the appropriateness of contractors' profitability levels. The legislation requires DOD to develop a plan and issue an annual report to ensure that its policies are structured to meet the long-term needs of DOD for industrial resources and technology innovation. On the basis of our previous reports and our current findings, we believe that meaningful methods for measuring profitability would require gathering and using segment-level data to measure contractors' profitability.

Major Efforts to Gather Segment-Level Data

Not since 1983 has the necessary segment-level financial data been collected to determine the level of defense contractor profitability. DOD's DPAIR collected segment-level financial data showing that the defense industry had experienced high levels of profitability during 1980-83 when compared with the non-defense durable goods manufacturers. As a result, policy changes were made that reduced the overall profitability of defense contractors. Since 1986, GAO has issued several reports in response to congressional requests concerning the effect that selected government policies were having on defense contractors' overall level of

profitability and how they could be evaluated.¹ Despite the defense industry's opposition, many of these reports called for a program that would require major government contractors to annually report segment-level financial data.

Use of the Cost-of-Capital Concept Will Require Segment-Level Data and Allocation

The organized collection and analysis of verified financial and accounting segment-level data are necessary both to properly determine the impact of the government's policies on contractors' performing government contracts and to compute the cost of capital. Changes to statutes, regulations, and DOD's procurement practices would best be made through a systematic measuring of the health of the defense industry that would incorporate segment-level data and technical analysis.

An accurate financial reporting program would require (1) the mandatory participation of government contractors, (2) the annual collection of segment-level profitability data, (3) an analysis of data on an aggregated, rather than on a contract or contractor basis, and (4) confidentiality of segment data (i.e., through the use of an independent firm, similar to a public accounting firm, to collect and aggregate segment-level data before making it available to another source). Since 1968, the British government has annually collected from its contractors segment-level profitability data. The British system is similar to the financial reporting program just described.

Conclusion

In the 1989 Defense Authorization Act, the Congress directed DOD to develop and maintain a plan to ensure its policies are structured to meet the long-term needs of DOD for industrial resources and technology innovation. On the basis of our analysis, this mandate seems valid.

Earlier chapters of this report have suggested techniques that DOD could use to determine whether defense contractors' profitability were

¹Government Contracting: Financial Measures for Evaluating Contractor Profitability (GAO/NSIAD-90-200BR, Sept. 12, 1990).
Government Contracting: Compensation of Defense Contractors' Working Capital Financing Cost (GAO/NSIAD-90-33, Jan. 31, 1990).
Government Contracting: Effect of Changes in Procurement and Tax Policy on the Defense Industry (GAO/NSIAD-89-121, May 17, 1989).
Cost Accounting Standard 414: How DOD's Budget Profit Policy and Contractors' Investments Relate to Standard 414 (GAO/NSIAD-88-41BR, Nov. 3, 1987).
Government Contracting: A Proposal for a Program to Study the Profitability of Government Contractors (GAO/NSIAD-87-175, Sept. 17, 1987).
Government Contracting: Assessment of the Study of Defense Contractor Profitability (GAO/NSIAD-87-50, Dec. 23, 1986).

reasonable. However, the most appropriate and fair techniques for assessing contractors' profitability could not be used until a system to collect the necessary segment-level financial data is in place.

Recommendation to the Congress

Policymakers need the financial information to systematically analyze the cumulative impact of the government's policies on defense contractors' profitability. Without this information questions raised about the financial impact of existing policies on the health of the industry will not be adequately answered. We recommend that the Congress enact legislation to require government contractors to annually report segment-level financial data to enable policymakers to measure profitability and the cost of capital for assessing the financial health of the defense industry.

Methodology for Calculating the Cost of Capital

This appendix describes the basic methodology and sources of data used to calculate the cost of capital for the companies in the Standard and Poors' Industrial Index. The initial step was to identify the appropriate components of capital for a company, namely short-term debt, long-term debt, deferred taxes, preferred stock, and common equity (retained earnings and common stock).

The next step was to determine the cost of the components. The cost of debt is the interest rate or yield, while the cost of preferred stock is the dividend rate. Deferred taxes have no cost since they are considered a free source of financing. There are several methods that can be used to estimate the cost of equity capital. We used the Dividend Yield Plus Growth Discounted Cash Flow Method and the Capital Asset Pricing Model because they were the generally accepted methods used by financial analysts.

As the third step, we determined the percent that each capital item represented to the total capital, which was then multiplied by the cost rate. The total of all the rates is the company's weighted average cost of capital. We computed the weighted average cost of capital on an after tax basis.

Dividend Yield Plus Growth Discounted Cash Flow Model

The principal elements of the Discounted Cash Flow method are the company's current common stock price and expected dividend and growth rate. The underlying assumption of this method is that investors view the current value of a share of stock as the present value of future dividends. The formula used to calculate the cost rate for equity capital under this method is as follows:

$$\frac{\text{Current Dividend Rate} + \text{Expected Dividend Growth Rate}}{\text{Stock Price}}$$

Generally, the latest dividend indicated is used as the current dividend. We used the average of the highest and lowest stock price for the year as the current stock price. Other options are to use the spot price (a particular day's stock price) or the average stock price over a specified period of time (e.g. a six-month period). We obtained the estimated dividend growth figure from the Value Line Investment Survey.¹ There are

¹(c) Value Line, Inc. The Value Line Investment Survey, Part III Ratings and Reports from 1980 to 1989.

several other sources that can be used to obtain the expected dividend growth.

Capital Asset Pricing Model

The capital asset pricing model calculates the cost rate for equity capital on the basis of the rate of return required by the market for projects of equivalent risk. The capital asset pricing model makes the specific assumption that investors require compensation for risk only to the extent that risk is correlated with the overall performance of the stock market. In the capital asset pricing model, the cost rate for equity capital is determined as follows:

$\text{Risk Free Rate} + \text{Stock Beta} \times \text{Risk Premium}$

The return on Treasury Bills typically represents the risk free rate. We used the interest rate for 30-day Treasury Bills.² The stock beta measures the volatility or risk of a stock.³ We obtained stock betas from the Value Line Investment Survey. The risk premium is the difference between the return on common stocks (termed the "market" return) and the return on Treasury Bills. We used data from Ibbotson Associates to calculate the risk premium.⁴

²Some literature suggests that the yield on long-term bonds be used as the risk-free rate.

³Beta measures the extent to which a given stock moves with the market. A stock with a beta higher than 1.00 (which reflects the market as a whole) tends to be more volatile or riskier than the market. A stock with a beta of less than 1.00 is less risky.

⁴See Ibbotson, Roger G., and Rex A. Sinquefeld, Stocks, Bonds, Bills, and Inflation, 1989, updated in Stocks, Bonds, Bills, Inflation Yearbook, Ibbotson Associates, Chicago. All rights reserved.

**Appendix I
Methodology for Calculating the Cost
of Capital**

**Table I.1: Weighted Average Cost of
Capital Discounted Cash Flow
Methodology**

Dollars in millions

Component	Amount	Total capital (percent)	Cost rate (percent)	Weighted cost rate (percent)
Total debt	\$895.0	23.8	6.76	1.6
Deferred taxes	398.6	10.6	0	0
Preferred stock	0	0	0	0
Common equity	2,464.6	65.6	14.8 ^a	9.8 ^a
Total	\$3,758.2	99.0		11.4a

^aUnder the capital asset pricing model, the cost of equity would be 15.6 percent and 10.2 percent on a weighted average basis. The total weighted average cost of capital for the company would increase to 11.8 percent.

Major Contributors to This Report

National Security and International Affairs Division, Washington, D.C.

Paul F. Math, Director
Clark G. Adams, Assistant Director
Ralph C. Dawn, Evaluator-in-Charge
James L. Field, Doctoral Research Program Fellow

Philadelphia Regional Office

James A. Przedzial, Regional Assignment Manager
Melissa S. Harless, Evaluator
Harry S. Shanis, Operations Research Analyst
Wayne J. Turowski, Computer Analyst